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September 10, 2010

Mr. David Dickerson
USEPA, OSRR07-4
5 Post Office Square – Suite 100
Boston, MA 02109-3912

Re: **Explanation of Significant Differences for Use of a Lower Harbor CAD Cell (June 2010 Draft)**

Dear Mr. Dickerson,

Please accept the following as The Coalition for Buzzards Bay's ("The Coalition's") comments on the Draft Fourth Explanation of Significant Differences ("ESD") for use of a Lower Harbor Confined Aquatic Disposal (CAD) Cell ("LHCC") in lower New Bedford Harbor for disposal of Superfund contaminated sediments.

The Coalition finds that while the proposed remedy in the ESD is technically feasible, the Environmental Protection Agency ("EPA") has failed to provide adequate information to meet the standards required under both the federal Clean Water Act ("CWA") and the federal Toxic Substances Control Act ("TSCA"). Specifically, under the CWA, EPA must find that "the siting, construction, filling, and long-term operation and maintenance (O&M) of the proposed LHCC represents the **least damaging practical alternative** to addressing potential impacts from PCB-contaminated sediments to wetlands and aquatic habitats within NBH." (ESD at 2-3, emphasis added) Additionally, under TSCA, EPA must find that "the permanent disposal of PCB contaminated sediment into the LHCC **will not pose an unreasonable risk of injury to health or the environment**." (ESD at 3, emphasis added)

In order to meet the mandates of the CWA and TSCA, EPA must issue a redrafted ESD providing additional detail and explaining why the proposed LHCC is a better alternative than the current off-site disposal method.

The Coalition is a membership-supported nonprofit organization dedicated to the restoration, protection and sustainable use and enjoyment of Buzzards Bay and its watershed. The Coalition works to improve the health of the Bay ecosystem for all through education, conservation, research and advocacy. We represent more than 7,500 individuals, families, organizations and businesses in Southeastern Massachusetts. We also own land and hold conservation interests on substantial parcels of waterfront property along the estuary including the Acushnet Sawmill and Marsh Island, and earlier this year we relocated our office to New Bedford's downtown historic waterfront district.

The Coalition shares the community's and EPA's goal of achieving a clean harbor as soon as possible, and we support EPA's efforts to find and assess innovative alternatives which expedite

clean-up objectives. The application of a CAD Cell for the lower harbor may be one of those viable alternatives. However, EPA must demonstrate and insure that the ultimate remedies applied are the most protective of human health and our environment.

The Coalition has retained Dr. Henry Bokuniewicz, Professor of Oceanography at the School of Marine and Atmospheric Sciences at Stony Brook University in New York to provide an independent review of the ESD. Dr. Bokuniewicz's CV attached. Dr. Bokuniewicz's review will be referenced throughout our comments and is attached to these comments as Appendix A. **Overall, Dr. Bokuniewicz determined "that while the operation is feasible as described, it is not simply done and there are many important details to be decided." (Bokuniewicz at 1)**

The following comments will address the specific areas that require more detail and must be addressed in a reissued ESD.

The ESD must include an alternatives analysis. In order to conclusively determine that the proposed LHCC is the least damaging practical alternative, EPA must provide a detailed comparison between the current off-site disposal method and the proposed LHCC option. At a minimum, this comparison needs to show that, when compared to the current off-site disposal method, the siting, construction, filling and long-term operation and maintenance of the proposed LHCC will result in less damage to the environment within New Bedford Harbor and the public's health. In order to truly evaluate the two alternatives, a more detailed and specific plan must first be established for the proposed LHCC. While, according to the ESD, "EPA believes that use of an LHCC is a protective and cost-effective approach compared to offsite disposal for these sediments," (ESD at 7), meeting this criteria, alone, does not fulfill the standard required under the Clean Water Act. Instead, EPA must show that this alternative is the least damaging practical alternative.

While it is possible that an earlier cleanup of the lower harbor will result in less impact to the public's health due to a decrease in exposure time, EPA must prove this, along with any other benefits, in the ESD.

The exact location of the Superfund LHCC cell must be specified in the ESD. Under the current draft ESD, EPA proposes to locate the Superfund LHCC within the state-approved Dredge Material Management Plan ("DMMP") area. (ESD at 7) This area is located between the Route 195 and Route 6 bridges and was selected as the preferred location for navigational CAD cells in the October 2003 Final Environmental Impact Report prepared by the Massachusetts Office of Coastal Zone Management. While this preferred location may be the best option within the harbor, the specific site within this area is needed to accurately evaluate any potential impacts on the harbor from the CAD cell.

The size of the Superfund LHCC must be determined. EPA has determined that a "650-foot square CAD cell excavated 47 ft below the existing sediment surface is sufficient in size to hold and cap the sediments proposed for a lower harbor CAD cell and to contain the lateral spread and collapse of the dredged material discharge during placement." (ESD at 9) According to the draft ESD, approximately 300,000 cy of PCB contaminated sediment will be placed into the LHCC. However, the ESD goes on to state that the volume of *in situ* sediments to be placed in the LHCC "shall not be greater than the volume of *in situ* sediments slated for CDF D (approximately 725,000 cy) minus the volume of *in situ* sediments disposed or to be disposed offsite pursuant to the 2002 ESD (approximately 150,000 cy as of 6/1/10)," which equals 575,000 cy. (ESD at 2) Additionally, if sufficient funding was obtained to reduce the placement schedule from three years to one or two

years, the size of the CAD cell needed to accommodate 300,000 cy of sediment would need to increase due to the decreased time for consolidation. (ESD at 11) In other words, quicker disposal requires more space for sediment consolidation. Finally, there is the potential for collaboration with the ongoing navigational dredging which would result in a large combined Superfund/navigational dredging CAD cell. (ESD at 13) The size of the LHCC is critical to the ultimate footprint and environmental impact the LHCC will have on New Bedford Harbor and must be selected and described in the ESD before the project moves forward.

The method of disposal for placement of contaminated dredge material into the Superfund LHCC must be selected. The draft ESD provides that "the proposed LHCC would be dredged using mechanical dredging equipment similar to that used for the navigational dredging to date." (ESD at 8) The draft ESD goes on to state, "Depending on the type of equipment used, the dredged sediment would be placed in the LHCC by either opening the bottom of the scow (if a "split-hull" scow is used) or by using an excavator bucket to remove sediment from the scow and to place them in the LHCC." (ESD at 8) According to Dr. Bokuniewicz, "There are advantages and disadvantages to both discharge methods, but the estimates of the uncontrolled release of particulate contaminants into the water column will be different." (Bokuniewicz at 2) The ESD must select a disposal method and, once a method is selected, model the respective sediment losses expected during disposal. Losses are also dependent on the time of year and tide cycle when dredging and disposal is taking place. The schedule for dredging and disposal to the Superfund LHCC must be included in the ESD and incorporated into the model.

The cap material for the Superfund LHCC must be determined. According to the ESD, the cap will consist of "3 feet of sandy material" which will "prevent contact with, and the release of, contaminants from the underlying deposited Superfund sediments." (ESD at 8) "The nature of the cap is an important detail that is not well-described in the documents, but needs to be well-specified in the final design." (Bokuniewicz at 2) **The description of "sandy material" is insufficient to determine whether this will be an effective cap.** EPA must assess the specific properties, density, permeability and assimilative capacity of various capping materials and select the best material for this site. Most importantly, the capping material must contain the necessary organic content to retain PCB contaminated sediment that may be released in pore water. While the ESD states, "After capping, the contaminants expelled from the dredged material by consolidation would be contained in the lower foot of the cap" (ESD at 10), this cannot be confirmed without knowing the specific cap properties. Additionally, the composition of the cap will also determine what benthic communities will be reestablished at the site and clearly, deep burrowers want to be discouraged.

The capping operation must be fully described in the ESD. The process used to cap the Superfund LHCC is an important element of the overall success of the cap. Prior to cap placement, the contaminated sediment will begin to consolidate, resulting in the loss of pore water containing contaminated PCB sediment. This initial loss, throughout the various disposal stages, must be modeled using the final volume of contaminated sediment that will be placed in the LHCC. The ESD must also provide how the cap will be layered on the CAD cell. As Dr. Bokuniewicz identified, when a dense layer of sand is placed on top of mud, the arrangement is inherently unstable and may result in sediment movement. (Bokuniewicz at 3) This movement could ultimately result in a cap with variable thickness and periodic ridges. These ridges were present in the 2009 capping study of Navigational CAD Cell #2 in New Bedford Harbor. The ESD must ensure that the cap layer is a uniform and consistent thickness as the dredge material consolidates over time.

According to the draft ESD, the use of activated carbon to "strip" PCBs in the water column within the CAD cell is being explored through large-scale laboratory studies to evaluate whether it could minimize PCBs that might otherwise be released into the environment. (ESD at 11) In Dr. Bokuniewicz's review, he identified the use of interim caps of thin, light layers of sand and activated carbon as a potentially more effective method that should also be evaluated. (Bokuniewicz at 4) A final determination as to the environmental benefits of activated carbon must be made before the Superfund LHCC is selected as a disposal method.

The ESD must address long-term cap stability and the risk of cap disruption. The cap design must be specified and the ESD must demonstrate that the cap is stable enough or sufficiently located so as to withstand or avoid the risk of incidental disruption by factors such as dragging anchors or hull strikes. The cap thickness and composition must be determined based on their ability to guard against these types of disturbances. The ESD must also state what uses will be permissible over the capped area and how the cap will be protective of human health and the environment.

The ESD must establish and detail an immediate and long-term monitoring and Operation & Maintenance plan for the Superfund LHCC. The ESD fails to include a monitoring plan for the proposed Superfund LHCC. According to Dr. Bokuniewicz, "Monitoring should be designed to insure, first, that the performance criteria of the contract are met and, second, to verify the predictions of the behavior of the operations made in advance to insure compliance during the operation." (Bokuniewicz at 3) Additionally, since consolidation goes quickly at first and slows down over time, monitoring observations should be scheduled accordingly, i.e., more frequently at first. (Bokuniewicz at 3) The use of reflector plates in the cap should also be considered. These plates, which can be detected by seismic reflection profiling, can help to distinguish between consolidation and erosion over time. Monitoring should also be designed to detect any "changes in the grain size of the surficial sediments of the cap" as well as "the development of surficial bedforms." (Bokuniewicz at 4)

Under Attachment B of the ESD, "TSCA 40 CFR Section 761.61(c) Determination," #6, "For the first two years after capping, this monitoring shall be performed semi-annually (except that the biological evaluation shall only be performed annually). For the third, fourth and fifth year after capping, this monitoring shall be performed annually." Attachment B, #6 also provides that, "Monitoring reports for each monitoring event shall be submitted to EPA no later than one year after all monitoring data has been received for a given monitoring event." This monitoring timeline is insufficient. Monitoring must occur multiple times a year and reports must be submitted to EPA and a steering committee to ensure that any problems are immediately detected and fixed as soon as possible.

In order to ensure a transparent process that allows for community input throughout the planning and implementation process, there must be future opportunities to review the details of the plan as they are developed and finalized. The use of adaptive management is a central component of this process. This method can only be effective if the actual results during project implementation are compared to the anticipated results estimated through modeling.

The ESD must require the formation of a steering committee. The Coalition supports the formation of a steering committee with broad stakeholder participation to oversee the immediate and long-term monitoring of the proposed LHCC. This committee should include representatives from relevant federal and state agencies, local town and city representatives as well as other

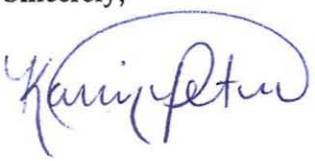
interested stakeholders, including local concerned citizens, DEP, EPA, the City of New Bedford, and advocacy groups. The formation of this committee must be established in the ESD.

Conclusion

While a Superfund LHCC may be a feasible option for Superfund contaminated sediment disposal in New Bedford Harbor, EPA has failed to provide sufficient information in the draft ESD to determine whether the proposed plan will result in an environmentally protective option for New Bedford. EPA must issue a redrafted ESD providing additional detail and an alternatives analysis which conclusively demonstrates that the proposed Superfund LHCC is a better alternative than the current off-site disposal method.

We thank you for this opportunity to comment and encourage you to contact us with any questions.

Sincerely,



Korrin N. Petersen, Esq.
Vice-President, Advocacy

Cc: Senator John Kerry
Senator Scott Brown
Congressman Barney Frank

Senator Mark Montigny
Representative Antonio Cabral
Representative Stephen Canessa
Representative Robert Koczera
Representative William Straus
Representative John Quinn

Mayor Scott Lang
Kristin Decas, New Bedford Harbor Development Commission

Acushnet Board of Selectmen
Fairhaven Board of Selectmen

Encl: Memo from Dr. Henry Bokuniewicz
Dr. Henry Bokuniewicz CV

SoMAS
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Stony Brook University, Stony Brook, NY 11794-5000
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Henry Bokuniewicz, Professor

August 17, 2010

The Coalition for Buzzards Bay
114 Front Street
New Bedford, MA 02740

Attention: Kerri J. Murphy, Esquire

Dear Ms. Murphy:

As requested, I am writing with my comments concerning the "Fourth explanation of Significant Differences for use of a Lower Harbor CAD Cell, New Bedford Harbor Superfund Site, Operable Unit #1, New Bedford, Massachusetts (June 2010 DRAFT)". I have read the ESD, as well as the ERDC (2010) report on the "Assessment of Contaminant Loss and Sizing for Proposed Lower Harbor Confined Aquatic Disposal Cell (CAD), New Bedford Harbor Superfund Site", the EPA "Report on the Effects of Hot Spot Dredging Operations New Bedford Harbor Superfund Site, New Bedford Massachusetts (October, 1977), and the "Final 2009 Bathymetric Survey of Pilot Underwater Cap New Bedford Harbor Superfund Site" prepared by Jacobs Engineering (2010).

I believe that the operation can be done more-or-less as described. However, while the operation is feasible as described, it is not simply done and there are many important details to be decided. The project and the monitoring plan have yet to be designed; there were too few details on which to base an assessment. The monitoring (attachment B item 6), in particular, is too sparsely described to evaluate. In what follows, I offer some specific comments on (a) the calculation of estimated losses, (b) dispersive losses during placement, (c) the cap material, (d) the capping operation, (e) erosion, (f) monitoring and (g) the experimental use of charcoal.

a. Estimated losses: The estimated losses during the operation are reasonable, although, undoubtedly, different attempts will give different numbers, depending on assumptions. The authors of the "Report on the Effects of Hot Spot Dredging Operations...." concluded that the net transport under the bridge of 57 Kilograms in 260 days (page 2-12), that's 125 pounds in 260 days or 4.8 pounds per ten-day period. I suspect that the lower harbor is a fairly effective settling basin. As a practical matter, most of this would probably be deposited in over deepened, dredged channels rather than as a uniform layer, and may be dredged during normal navigation dredging. A thin, off-channel layer would be mixed and diluted into the ambient sediment by burrowing organisms. The authors set the "acceptable limit" at 240 Kilograms (528 pounds) per 260 days or 20 pounds per ten-day period. The data is solid, and the calculation is both reasonable and an honest one, but the answer has some inevitable uncertainty in it that was not evaluated. Specifically, Figure 2-4 doesn't have uncertainty bars on it, like those on figures 2-5 to 2-8. There are three classic difficulties with the attempt:

1. The problem of concentration versus load. The "9.2 pounds per ten-day period" is based on the fact that a change in sediment concentration as small as 1 ppm cannot be measured. The

amount (load) of PCB is then calculated that would cause a 1 ppm change in a 4-cm thick layer of sediment in the entire lower harbor. The authors include discussion of upper and lower estimates, but the 4-cm must include some uncertainty. Of course, if the value is 2 cm, or 10 cm, you'd get different numbers. Further, even if the change in concentration is below 1 ppm, the load can still be large, perhaps, unacceptable.

2. The net flux under the bridge is a small difference between two large numbers. A great deal of water flows in on the flood tide and out on the ebb. The difference between these two large numbers can be a small number (equal to the river inflow). This flow has to be multiplied by the PCB concentration to get the flux under the bridge. Because the inflow of water and outflow of water can be very close, the concentrations of PCBs need to be measured very accurately to get a good value for the net flux. The authors of the report did as good a job as anyone could, and better than most, but there is still some uncertainty in the answer due to the difficulty.

3. The third problem that injects uncertainty into the final answer is that "the average of the product" (of the tidal flow times the concentration) is not equal to the "product of the averages". The authors use the latter, the average flood (or ebb) volume of water times the average of the concentrations during that same period. That's a reasonable approach, but if you did the calculation differently you'd get a different number from the same data, maybe larger, maybe smaller, it depends on how the two values are correlated.

The releases have been estimated in advance, but probably need to be forecast again when the details of the project are decided. If such a prediction is critical to the success of the operation, further measurements should be incorporated in a monitoring program.

b. Placement: There will always be some dispersive losses, although probably no more than a few percent in the worse case. It was undecided whether split-hull barges or (closed-bucket?) clamshells would be used to place the material. There are advantages and disadvantages to both discharge methods, but the estimates of the uncontrolled release of particulate contaminants into the water column will be different. Losses might be minimized by the use of silt curtains. They probably are good to have, but they are not fool-proof. Further precautions might be taken by the choice of the disposal technique and maybe by timing the disposal at, say, times of slack tide. All of these tactics take time and effort and the benefits may be marginal.

c. Cap material: The nature of the cap is an important detail that is not well-described in the documents, but needs to be well-specified in the final design. The predictions will depend on its properties, density, permeability and, especially, the assimilative capacity. For example, to accommodate contaminants from the pore water from "11 feet of settlement" after the cap is in place (item c, p. 9) in the "lower foot of cap" (item k p. 10), the organic content of the cap is critical. A sand cap too tends to be heavy and permeable, possibly leading to a greater and faster release of pore water from the underlying deposit. More importantly, a sand cap will determine,

in large part, the type of benthic community that will recolonize. I would imagine that habitats favorable to deep-burrowers are to be avoided, in general.

d. Capping operation: The contaminated sediment will start to consolidate and expel pore water during the process, and before the cap is in place, as well as after the cap is in place. These losses should be estimated. They may be small, but the decision made whether or not they're acceptable. In the 2009 capping study, it is noteworthy to see ridges in the sand cap (figure 2 of that report) presumably caused by discharge as the hopper was traveling on parallel tracks. One of the risks is the potential loss of integrity of the capped deposit, not by erosion of the cap, but by mass movement within the layered deposit itself. Mud has a high water content, lower density and poor engineering properties. When a more dense layer of sand is put on top, the arrangement is inherently unstable, but whether or not the sediment will move depends on its strength. I'd consider the possibility that an irregular loading caused by a cap of variable thickness (especially periodic ridges) might induce mass motion, like mud diapers.

If it is unstable, the mud could conceivably be squeezed up through thinner part of the cap. Geologically, the process is known to form "mud lumps" or "ball and pillow" structures. Again, there's not enough information to know if this is a problem here, but a sand cap that has thick ridges and thin cover in between could be a concern..

e. Erosion: Storms should not be expected to excavate pits; as long as the cap is properly designed, erosional loss of the cap by waves or tides should not be expected. The hurricane barrier limits the transfer of storm energy from the Buzzards Bay and limits waves to locally wind-driven waves which should be expected to be relatively small. What might be a problem would be erosion due to flooding from upland; that is, forcing flood water to drain over the site through the hurricane barrier. Historical floods might be examined, but I suspect that any flood big enough to pose an erosional threat would give everyone a lot more, other problems to worry about.

Incidental disruption of the cap by, say dragging anchors or bottom-trawls might be anticipated in the cap design. Drag and trawl scars are often recognized in side-scan sonar records or multibeam records in other areas. The depth of these disturbances can be estimated, even if no records are available from the Harbor itself. Cap thickness and/or cap composition might then be chosen to guard against these sorts of disturbances.

f. Monitoring: Monitoring should be designed to insure, first, that the performance criteria of the contract are met and, second, to verify the predictions of the behavior of the operations made in advance to insure compliance during the operation. (I assume that the contract will be performance based at least in part). I understand that the Corps will do the monitoring rather than the contractor. Monitoring should be scheduled more frequently at first and, if all goes as expected, at longer intervals. The consolidation, for example, goes quickly at first and slows down after some time. The monitoring observations should be spaced likewise; more frequently at first and spaced out as time goes on.

There must be opportunity for adaptive management. It's not possible to anticipate all procedural problems or outcomes, but the results of monitoring need to be evaluated promptly so corrective action can be taken if needed. If the bathymetric surveys show that the water has gotten deepened over the cap, it would be uncertain whether that's because of consolidation of the mud under the weight of the cap or erosion of the cap itself. I understand that burying plates in the cap (that can be detected by, for example, seismic reflection profiling) might be used to distinguish the two possibilities. If the layer of cap above the plate gets thinner, it would be a sign of erosion. As

I've said, in this case, I wouldn't expect erosion especially if the cap is fairly coarse grained but the monitoring results should be designed to be unequivocal. Other evidence might be to look for changes in the grain size of the surficial sediments of the cap, or looking for the development of surficial bedforms.

g. Use of charcoal: Although it might be worth a try, I'm afraid that I'm skeptical of "sweeping" dissolved PCB's from the water column by sprinkling charcoal because I would expect some water flow through the cell and even a slow circulation might flush fine particles out. In addition, water density differences due to temperature and salinity seem not to have been considered in the discussion of the flushing of the bay water over the open depression (i.e. stratification of the water column over the depression) or in the advection of pore-water (i.e. gravitational convection). I do not believe these are fatal considerations but they should be considered in the final analysis and I imagine that interim caps of thin, light layers of sand and charcoal would be more effective.

The EPA seemed open to having a management "steering" committee to review the monitoring results immediately (within a few days?) for any alarming results, while a full technical report takes the time it needs.

I hope you find these comments useful. Please don't hesitate to contact me if you have any questions.

Sincerely,

Henry Bokuniewicz,
Professor of Oceanography

HB/ed
MurphyKaugust2010.doc

VITA

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Education:

Ph.D.	Yale University, 1976	
M. Phil.	Yale University, 1973	
B. A.	University of Illinois, Champaign-Urbana Campus, 1971	

Present Position: Professor of Oceanography
Marine Sciences Research Center
State University of New York at Stony Brook

Director, Long Island Groundwater Research Institute

Previous positions:

MSRC Associate Dean for Education	1992-1998
Associate Professor, Oceanography	1982-1991
Assistant Professor, Oceanography	1977-1982
Post-doctoral Research Associate, Geophysics, Yale University	1976-1977

Representative Service, School of Marine and Atmospheric Sciences:

Served as advisor to 41 Graduate Students (3 Pending Ph.D. Students)

Associate Dean for Education – 1992-1998
Director of Graduate Studies – 1989-1994
Director, Coastal Oceans Strategy since 1985

SoMAS Committees: Reading Room Committee (1978-1980), Graduate Programs (1978, 1988, 2001-2), Admissions Committee (1980-1980-1988), Ship's Committee (1979-91, 2002) Comprehensive Examination Committee (1980, 81, 82, 83, 84, 85, 86, 87), Awards Committee (1981, 82, 84, 85, 86), Executive Committee (1982-1987), Distinguished Visiting Scholar Committee (1984, 85, 86), Chair: Curriculum Committee (1984, 85, 86), 5-year Review Committee (1987, 88), Electronic Shop Committee (1988-90), Distinguished Teaching Award Committee (1989), LI 2000 Report (1990) Chair: Minority Recruitment Committee, Chair: Environmental Engineering Committee, Award Committee (1998-2002), Merit Review Panel (1998, 2008), Funds Committee 2002, Curriculum Committee 2002-2003, Co-chair: Grievance Committee 2003, Comprehensive Exam 2005-2008, Chair: Dialogue Committee 2007, Camp Seawolf Advisory Committee since 2005.

Search Committees: 1979 (Associate Director of Research), 1979 (Chemical Oceanographer), 1979 (Coastal Engineer), 1980 (Coastal processes), 1981 (Coastal processes), 1982 (Wave specialist), 1983 (Biological Oceanographer), 1984 (Coastal Oceanographer), 1986 (Field Technician), 1987 (Director of the Waste Management Institute), 1987, 1992, 1999, 2005 (Geological Oceanographer), 1987 (Environmental Biologist), 1987 (Chemical Oceanographer), 1987 (Associate Director for Research), 1988 (Minority Development Officer), 1989 (Microbiologist), 1990 (Graphic Artist), 1992 (Analytical Technician), 1994 (Research Vessel Captain), 1998 (Coastal Meteorologist), 2001 (Chemical Oceanographer), 2003 (Assistant Dean), 2007 (Sea Grant Director)

REU summer program research supervisor (2005 -07)

Representative University Service

Chair: Committee on Research Administration (1982-87), Federated Learning Community Curriculum Committee (1982), M-RAP Fellowship (1988-92), President's Award Selection Committee (1985), Collegium on Global Change (1989-90), NY Press Assoc. Panel (1992), Dean's Committee for Environmental Science (1996), SBU Earthstock Panel (2004)

Advisory Committees: Telephone (1983-86), Rehabilitations (1983-84), Indirect Costs (1984-86), Facilities Engineering (1986-88), Museum of Long Island (1998)

Search Committees: 1984 (Asst. Vice-Pres for Human Resources), 1984 (Director of Grants Management, 1987 (Asst. Vice President for Facilities Engineering.), 1987 (Asst. Vice Provost), 1998 (Assoc. Dean of Graduate School)

Courses: Geological Oceanography (graduate, 1978-2009), Long Island Sound: Science and Use (introductory undergraduate, 1981-2009), Engineering and Coastal Geology (advanced undergraduate, 2001-09), Waves, Tides and Beaches (advanced undergraduate, 1998-2009), Long Island Groundwater (on-line graduate, 2005-2009), Long Island Beaches (on-line graduate, 2005-2009), special sections of MAR 101 and MAR 104 for high school students (2006-2009); and others.

Representative Professional Service

Service Committee Memberships: U.S. Army Corps of Engineers Public Involvement Coordination Group (1979-90); Department of Environmental Conservation, Hudson River Management Plan, Advisory Committee (1988-90); U.S. EPA Long Island Sound Technical Advisory Committee (1986-90); EPA Long Island Sound Contaminant Committee (1989-90); EPA New York Bight Technical Advisory Committee (1989); EPA Sediment transport in the NY Bight (1989-90); NY State Disaster Preparedness Committee's Technical Advisory Committee on Coastal Erosion (1988-89); EPA Toxic Working Group for NY Bight and Harbor (1991-1992); EPA Toxic Working Group for Long Island Sound (1991-1992); USACE DAMOS Review Panel (1991); WEDA Environmental Commission (1995); USACE NY Bight Ecology Group (1996); NYS DEC Toxics Working Group for the Hudson-Raritan Estuary (1995-1998); NY-NJ Estuary Program for Contaminant Reduction (1998); MMS Working Group on Atlantic Margin Offshore Sediment (2000); USACE Norton Bay Technical Committee (2002-2003); USACE Environmental Technical Management Committee for the Reformulation Study (2000); Town of Brookhaven Advisory Committee for West Meadow Beach (2005); Cornell Cooperative Extension Advisory Board for Marine Affairs since 2001; Scientific Advisory Board to the Oceans and Great Lakes Ecosystem Conservation Council; New State Initiative at Ecosystem-Based Management (2007-08); Advisory Committee for the Dredged Material Management Project of the South Shore Estuary Program since 2008; Pine Barrens Technical Advisory Committee since 1994; NPS "Blue Ribbon" Panel on Jamaica Bay (2003); Committee for Open-Space Acquisitions, Town of Brookhaven since 1995; Board of the Foundation for Ecological Research in the Northeast (FERN) since 2003; Scholarship Committee (Member and Past-Chair), New York Section, American Water Works Association since 2003; USACE/EPS Scientific Panel for the Historic Area Remediation Site (HARS) Management and Monitoring Plan since 2002; National Park Service's Science Board for Jamaica Bay since 2005; Technical Advisory Committee for the Suffolk County Comprehensive Water Resources Management Plan since 2007.

Co-sponsored the annual Pine Barrens Research Forum with BNL and the Pine Barrens Commission since 1994.

Chair of Suffolk County's Ground-water Guardian Team since 1997.

Convened a symposium on Subaqueous Borrow Pit Research and Management for the US Army Corps of Engineers (2006),

Hosted an EPA/NYS DEC training session on "Groundwater Modeling Management and Application for Decision-Making" (2006)

Hosted a three-day (2005) training session on techniques of parameter estimation (PEST) at Stony Brook

Hosted a one-day workshop on Advanced Groundwater Remediation Techniques (2008) at Stony Brook

Convened a special session on the science of the Lloyd Aquifer at the 13th Conference on the Geology of Long Island and Metropolitan in 2007

Occasional advisor to the Town of Smithtown on erosion and dredging at the Nissequogue River.

Reviewer for: Advances in Water Resources, American Museum on Natural History, American Scientist, American Shore & Beach Preservation Society, Biogeochemistry, Brooklyn College, Canadian Journal of Fisheries and Aquatic Sciences, Center for Field Research, City University of New York, East Carolina University, Elk Horn Slough National Estuary Reserve, EPA, Estuaries, Estuarine and Coastal Marine Science, Estuarine Coastal and Shelf Science, Estuarine Research Federation, FEMA, Geological Society of America, Geophysical Research Letters, Hudson River Foundation, International Journal for Geographical Information Systems, Journal of Chemistry and Ecology, Journal of Coastal Research, Journal of Geology , Journal of Geophysical Research, Journal of Great Lakes Research, Journal of Hydraulic Engineering, Journal of Hydrology, Journal of Marine Environmental Engineers, Journal of Sedimentary Petrology, Journal of Sedimentary Research, Kiel University, Limnology & Oceanography, Marine Chemistry, Marine Geology, Merrill Publishing Co., National Biological Services, National Sea Grant College Program, Nature, National Undersea Research Program, NOAA, North Carolina Dept. of Natural Resources, Northeastern Environmental Science, NSF, PSC-CUNY Research Award Program, Science, Sea Grant Institutes (CT, FL, NH, NJ, NY, ME, MIT, OR, RI, SC), Shannon Point Marine Center, Shore & Beach, Springer-Verlag, Stevens Institute of Technology, University of CT, University of FL , University of MA, USGS, US-Israel Binational Science Foundation, Woods Hole Oceanographic Institute and others.

National Service:

National Oceanic and Atmospheric Administration: Dredging and Large volume waste disposal (1978)
National Oceanic and Atmospheric Administration: Managing conflict in the use of estuaries (1984)
U.S. Congress Office of Technology Assessment Committee on offshore mining and marine minerals (1986-88)
National Research Council Committee on Contaminated Sediment (1987-88)
NSF Estuaries Workshop Series (co-convener, 1987-88)
National Transportation Board Committee on Dredging Windows (2001-2002)
National Research Council Committees dealing with Adaptive Management (2002-04)
EPA panelist for the review of STAR grants (2008-09)
Project Delivery Team for the Corps of Engineers Regional Sediment Management Program (2009)
Brookhaven National Laboratory Local Oversight and Monitoring Committee (2005-2006)

Co-hosted Training Sessions on MTBE and TBA in cooperation with the Interstate Technology and Regulatory Council and the NYS DEC in Denver (2005), in Reno (2006), in San Francisco (2005), in Memphis (2005) and Stony Brook (2008), Barcelona (2004), Wisconsin (2005), Copenhagen (2005) and Leipzig (2005).

Hosted various workshops on coastal issues for the U.S Army Corps of Engineers, the Long Island Coastal Alliance and the National Park Service.

International Service:

Member since 1987: International Council for the Exploration of the Sea (ICES) working group on effects of marine mining.
Member: Committee on Coastal Groundwater of the International Association for the Physical Sciences of the Oceans
Member since 2003: NYS Park "Twinnings" program of the Pine Barrens Commission.
Panel member (2002-2008) for the Kosciuszko Foundation scholarships for Polish scientists in support of graduate level research at US universities
Member of a LOICZ working group on coastal groundwater typologies and an associate member of the SCOR working group on ground-water fluxes
Member LOICZ Committee for global typology and nominated for the Scientific Steering Committee (2009).

Presentation on climate change, groundwater issues for UN ambassadors from Small Island States (2008)

Lycee Louis de Grand. Hosted high-school summer research student from Paris and visited the school to develop future collaborations.

Collaborative Research: Poland's Institute of Geophysics, Bari University, University of Venice, Istituto di Scienze Marine (Venice), University of the West Indies, University of Pisa, Universitat Autònoma de Barcelona, Bulgarian Institute of Water research, Romanian Marine Research institute, University of Bucharest, International Atomic Energy Agency, Namibian Ministry of Fisheries, Instituto Oceanografico de Universidade de Sao Paulo, University of Mauritius, IMEDEA of Mallorca (Spain), James Cook University (Australia), Australian Institute of Marine Science, CSIRO (Australia), and others.

Representative Community Service

NY Academy of Sciences' Scientists-in-Schools Program (1984-89)

Supervisor: Community Action Program, Ward Melville High School (1979-81), Coastal Science Projects, Long Beach High School (1986-87), Beach Studies, East Hampton High School (1979-83), Beach Surveys, Bayshore High School (1979-83), NY State Summer Intern Program (1980),North Shore Community Wave Observation Program (1982).

Public Lectures: NJ Marine Consortium Dredging Panel (1988); Dredging and disposal in LI Sound, League of Women Voters (2005); Towards a groundwater clearinghouse, LI Water Conference (2005); Contamination of Groundwater, LI EcoSummit (2004), Citizens Campaign for the Environment (1992, 1993); Images of the Pine Barrens, Pisa, Italy (2005); Climate Change on LI, Sachem Library (2007); MTBE a Groundwater Concern, keynote NYS Water Authorities Conference (1999); Setting the Stage for a LI Sound Tunnel, LI Business Forum (1991); Contaminants emerging in our water. Emerging contaminants in groundwater, Cornell University Program on Breast Cancer and Environmental Risk Factors (2008); and others.

Numerous public lectures on shore erosion on LI: BOCES (1997, 2000), Northport HS (2006), Ward Melville HS (1979-1981), Sawmill Middle School (1997), Bayshore HS (1979-1983), East Hampton HS (1979-1983), South Country Library (1994), Bellport Library (1994), Oak Beach Association (1994), BOCES (1994, 1995), Bayshore-Brightwaters Library (1993), LI Coastal Alliance (1991, 1992, 1993), Long Beach HS (1986, 1987), Sayville HS (1993), SBU Geosciences public lecture (2006), and others

For five years, hosted the "Groundwater University" at Camp Sea Wolf in Peconic Dunes as well as educational sessions at C.W. Post (April), Mepham High School, Bellmore (May), Shelter Rock Elementary School and Munsey Elementary School, Manhasset (June), Bayville Intermediate School (June), and Burr Intermediate School, Commack (November) reaching approximately 530 students.

Mentored eight high school students for the Intel Science search, one of whom, Jana Hirsh, was a semi-finalist with a project on the seismic signature of breaking waves. I've also served as a judge on numerous science fairs and the Envirothon.

Publications:

2008:

Bokuniewicz, H.J., M. Taniguchi, T., Ishitoibi, M. Charette, M. Allen and E.A. Kontar. 2008. Direct Measurements of Submarine Groundwater Discharge (SGD) over a fractured rock aquifer in Flamengo Bay Brazil. Estuarine, Coastal and Shelf Science: 76: 466-472.

Buonaiuto, F.S., Slattery, M., Bokuniewicz, H., 2008. Wave Modeling of Long Island Coastal Waters, Journal of Coastal Research, In review.

Buonaiuto, F. and H. Bokuniewicz, Hydrodynamic Partitioning of a Mixed Energy Tidal Inlet, Journal of Coastal Research, January 2008.

Coffey, R, BL Mayers, H Bokuniewicz and L Nurse. 2008. Submarine groundwater discharge in Barbados. In preparation.

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Beck, A.J., J. Rapaglia, J.K. Cochran, and H.J. Bokuniewicz, 2007. Radium mass-balance in Jamaica Bay, NY: Evidence for a substantial flux of submarine groundwater. Marine Chemistry: 106: 419-441.

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Buonaiuto, F.S., Bokuniewicz, H.J. and FitzGerald, D.M., 2007. Principal component analysis of morphology change at a tidal inlet: Shinnecock Inlet, NY Journal of Coastal Research. In press.

Munster, J.E., G.N. Hanson, Q. Liu and H. J. Bokuniewicz 2007. Major element chemistry of nitrate end members mixing in groundwater. Environmental Science and Technology. Submitted.

Seaver, K. H.J. Bokuniewicz, F. Buonaiuto. 2007. Evolution of erosional hot spots on a barrier island: Fire Island, New York. Coastal sediments '07, N. C. Kraus and J.D. Rosati, editors. Amer. Soc. Civil Engs. Vol. 3 pp 1722-1730.

2006

Bokuniewicz, H.J. 2006. Sedimentary Processes in the Hudson River Estuary. In "The Hudson River Estuary Ecosystem". J. Waldman and J. Levinton editors, Cambridge University Press: 39-50.

Burnett, W.C., P.K. Aggarwal, A. Aureli, H. Bokuniewicz, J.E. Cable, M.A. Charette, E. Kontar, S. Krupa, K.M. Kulkarni, A. Loveless, W.S. Moore, J.A. Oberdorfer, J. Oliveira, N. Ozyurt, P. Povinec, A.M. G. Privitera, R. Rajar, R.T. Ramessur, J. Scholten, T. Stieglitz, M. Taniguchi, J. V. Turner. 2006. Quantifying submarine groundwater discharge in the coastal zone via multiple methods. Science of the Total Environment 367: 498-543.

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Bokuniewicz, H.J. 2005. Endogenic and Exogenic Factors in “Encyclopedia of Coastal Sciences”, Maurice L. Schwartz, editor, Springer, the Netherlands 407-408.

Bokuniewicz, H.J. 2005. The Littoral. In Encyclopedia of Coastal Sciences, Maurice L. Schwartz editor, the Netherlands 592-594.

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